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CREMATION:

THE TREATMENT OF

THE BODY AFTER DEATH.

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BY

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THE first article, entitled "Our Treatment of the Dead," appeared in the CONTEMPORARY REVIEW of January, 1874, and the second on "Cremation, &c.," in the March number of the same journal. They are now republished together, in the present form, at the request of many who desire to promote the views advocated therein relating to the substitution of Cremation for Burial of the body.

March, 1874.

CREMATION:

THE TREATMENT OF THE BODY AFTER DEATH.

AFTER Death! The last faint breath had been noted, and another watched for so long, but in vain. The body lies there, pale and motionless, except only that the jaw sinks slowly but perceptibly. The pallor visibly increases, becomes more leaden in hue, and the profound tranquil sleep of Death reigns where just now were life and movement. Here, then, begins the eternal rest.

Rest! no, not for an instant. Never was there greater activity than at this moment exists in that still corpse. Activity, but of a different kind to that which was before. Already a thousand changes have commenced. Forces innumerable have attacked the dead. The rapidity of the vulture, with its keen scent for animal decay, is nothing to that of Nature's ceaseless agents now at full work before

us. That marvellously complex machine, but this moment the theatre of phenomena too subtle and too recondite to be comprehended ; denotable only by phraseology which stands for the unknown and incomputable—vital, because more than physical, more than chemical—is now consigned to the action of physical and chemical agencies alone. And these all operating in a direction the reverse of that which they held before death. A synthesis, then, developing the animal being. The stages of that synthesis, now, retraced, with another end, still formative, in view. Stages of decomposition, of decay, with its attendant putrescence ; process abhorrent to the living, who therefore desire its removal. "Bury the dead out of my sight," is the wholly natural sentiment of the survivor.

But Nature does nothing without ample meaning ; nothing without an object desirable in the interest of the body politic. It may then be useful to inquire what must of necessity happen if, instead of burying or attempting to preserve the dead, Nature follows an unimpeded course, and the lifeless animal is left to the action of laws in such case provided.

It is necessary first to state more exactly the conditions supposed to exist. Thus, the body must be exposed to air ; and must not be consumed as prey by some living animal. If it is closely covered with earth or left in water, the same result is attained as in the condition first-

named, although the steps of the process may be dissimilar.

The problem which Nature sets herself to work in disposing of dead animal matter is always one and the same. The order of the universe requires its performance; no other end is possible. The problem may be slowly worked, or quickly worked; the end is always one.

It may be thus stated:—The animal must be resolved into—

a. Carbonic Acid [CO_2], water [HO,], and ammonia [NH_3].

b. Mineral constituents, more or less oxidised, elements of the earth's structure: Lime, Phosphorus, Iron, Sulphur, Magnesia, &c.

The first group, gaseous in form, go into the atmosphere.

The second group, ponderous and solid, remain where the body lies, until dissolved and washed into the earth by rain.

Nature's object remains still unstated: the constant result of her work is before us; but wherefore are these changes? In her wonderful economy she must form and bountifully nourish her vegetable progeny; twin-brother life, to her, with that of animals. The perfect balance between plant existences and animal existences, must always be maintained, while "matter" courses through the eternal circle, becoming each in turn.

To state this more intelligibly by illustration: If

an animal be resolved into its ultimate constituents in a period, according to the surrounding circumstances, say, of four hours, of four months, of four years, or even of four thousand years—for it is impossible to deny that there may be instances of all these periods during which the process has continued—those elements which assume the gaseous form mingle at once with the atmosphere, and are taken up from it without delay by the ever open mouths of vegetable life. By a thousand pores in every leaf the carbonic acid which renders the atmosphere unfit for animal life is absorbed, the carbon being separated and assimilated to form the vegetable fibre, which, as wood, makes and furnishes our houses and ships, is burned for our warmth, or is stored up under pressure for coal. All this carbon has played its part, "and many parts," in its time, as animal existences from monad up to man. Our mahogany of to-day has been many negroes in its turn, and before the African existed was integral portions of many a generation of extinct species. And when the table which has borne so well some twenty thousand dinners, shall be broken up from pure debility and consigned to the fire; thence it will issue into the atmosphere once more as carbonic acid, again to be devoured by the nearest troop of hungry vegetables, green peas or cabbages in a London market garden—say, to be daintily served on the table which now stands in that other table's place, and where they

will speedily go to the making of "Lords of the Creation." And so on, again and again, as long as the world lasts.

Thus it is that an even balance is kept—demonstrable to the very last grain if we could only collect the data—between the total amounts of animal and of vegetable life existing together at any instant on our globe. There *must* be an unvarying relation between the decay of animal life and the food produced by that process for the elder twin, the vegetable world. Vegetables first, consumed by animals either directly or indirectly, as when they eat the flesh of animals who live on vegetables. Secondly, these animals daily casting off effete matters, and by decay after death providing the staple food for vegetation of every description. One the necessary complement of the other. The atmosphere, polluted by every animal whose breath is poison to every other animal, being every instant purified by plants, which taking out the deadly carbonic acid and assimilating carbon, restore to the air its oxygen, first necessary of animal existence.

I suppose that these facts are known to most readers, but I require a clear statement of them here as preliminary to my next subject; and in any case it can do no harm to reproduce a brief history of this marvellous and beautiful example of intimate relation between the two kingdoms.

I return to consider man's interference with the

process in question just hinted at in the quotation, "Bury the dead out of my sight."

The process of decomposition affecting an animal body is one that has a disagreeable, injurious, often fatal influence on the living man if sufficiently exposed to it. Thousands of human lives have been cut short by the poison of slowly decaying, and often diseased animal matter. Even the putrefaction of some of the most insignificant animals has sufficed to destroy the noblest. To give an illustration which comes nearly home to some of us—the grave-yard pollution of air and water alone has probably found a victim in some social circle known to more than one who may chance to read this paper. And I need hardly add that in times of pestilence its continuance has been often due mainly to the poisonous influence of the buried victims.

Man, then, throughout all historic periods, has got rid of its dead kin after some fashion. He has either hidden the body in a cave and closed the opening to protect its tenant from wild beasts, for the instinct of affection follows most naturally even the sadly changed remains of our dearest relative; or, the same instinct has led him to embalm and preserve as much as may be so preservable—a delay only of nature's certain work;—or, the body is buried beneath the earth's surface, in soil, in wood, in stone or metal:—each mode another contrivance to delay, but never to prevent the inevitable

change. Or, the body is burned, and so restored at once to its original elements, in which case Nature's work is hastened, her design anticipated, that is all. And after burning, the ashes may be wholly or in part preserved in some receptacle in obedience to the instinct of the survivor, referred to above. All forms of sepulture come more or less under one of these heads.*

One of the many social questions waiting to be solved, and which must be solved at no very remote period, is, Which of these various forms of treatment of the dead is the best for survivors?

This question may be regarded from two points of view, both possessing importance, not equally perhaps; but neither can be ignored.

A. From the point of view of Utility; as to what is best for the entire community.

B. From the point of view of Sentiment; the sentiment of affectionate memory for the deceased, which is cherished by the survivor.

I assume that there is no point of view to be regarded as belonging to the deceased person, and that no one believes that the dead has any interest in the matter. We who live may anxiously hope —as I should hope at least—to do no evil to survivors after death, whatever we may have done of harm to others during life. But, being deceased, I take it we can have no wishes or feelings touch-

* "Burial at sea" is a form of exposure, the body being rapidly devoured by marine animals.

ing this subject. What is best to be done with the dead is then mainly a question for the living, and to them it is one of extreme importance. When the globe was thinly peopled, and when there were no large bodies of men living in close neighbourhood, the subject was an inconsiderable one and could afford to wait, and might indeed be left for its solution to sentiment of any kind. But the rapid increase of population forces it into notice, and especially man's tendency to live in crowded cities. There is no necessity to prove, as the fact is too patent, that our present mode of treating the dead, namely, that by burial beneath the soil, is full of danger to the living. Hence intramural interment has been recently forbidden, first step in a series of reforms which must follow. At present we who dwell in towns are able to escape much evil by selecting a portion of ground distant—in this year of grace 1873—some five or ten miles from any very populous neighbourhood, and by sending our dead to be buried there:—laying by poison nevertheless, it is certain, for our children's children, who will find our remains polluting their water sources, when that now distant plot is covered, as it will be, more or less closely by human dwellings. For it can be a question of time only when every now waste spot will be utilized for food-production or for shelter, and when some other mode of disposing of the dead than that of burial must be adopted. If, therefore, burial in the soil be cer-

tainly injurious either now or in the future, has not the time already come to discuss the possibility of replacing it by a better process? We cannot too soon cease to do evil and learn to do well. Is it not indeed a social sin of no small magnitude to sow the seeds of disease and death broadcast, caring only to be certain that they cannot do much harm to our own generation. It may be granted, to anticipate objection, that it is quite possible that the bodies now buried may have lost most, if not all, their power of doing mischief by the time that the particular soil they inhabit is turned up again to the sun's rays, although this is by no means certain; but it is beyond dispute that the margin of safety as to time grows narrower year by year, and that pollution of wells and streams which supply the living must ere long arise wherever we bury our dead in this country. Well then, since every buried dead body enters sooner or later into the vegetable kingdom, why should we permit it, as it does in many cases, to cause an infinity of mischief during the long process?

Let us at this point glance at the economic view of the subject, for it is not so unimportant as, unconsidered, it may appear. For it is an economic subject whether we will it or not. No doubt a sentiment repugnant to any such view must arise in many minds, a sentiment altogether to be held in respect and sympathy. Be it so, the question remains strictly a question of prime necessity in the economic system of a crowded country. Nature

will have it so, whether we like it or not. She destines the material elements of my body to enter the vegetable world on purpose to supply another animal organism which takes my place. She wants me, and I *must* go. There is no help for it. When shall I follow—with quick obedience, or unwillingly, truant-like, traitor-like, to her and her grand design? Her capital is intended to bear good interest and to yield quick return: all her ways prove it—"increase and multiply" is her first and constant law. Shall her riches be hid in earth to corrupt and bear no present fruit; or be utilised, without loss of time, value, and interest, for the benefit of starving survivors? Nature hides no talent in a napkin; we, her unprofitable servants only, thwart her ways and delay the consummation of her will.

Is a practical illustration required? Nothing is easier. London was computed, by the census of 1871, to contain 3,254,260 persons, of whom 80,430 died within the year. I have come to the conclusion, after a very carefully made estimate, that the amount of ashes and bone earth, such as is derived by perfect combustion, belonging to and buried with those persons, is by weight about 206,820 lbs. The pecuniary value of this highly concentrated form of animal solids is very considerable. For this bone-earth may be regarded as equivalent to at least six or seven times its weight of dried but unburned bones, as they ordinarily exist in commerce. The amount of other solid matters re-

solvable by burning into the gaseous food of plants, but rendered unavailable by burial for, say, fifty or a hundred years or more, is about 5,584,000 lbs., the value of which is quite incalculable, but it is certainly enormous as compared with the preceding.

This is for the population of the metropolis only: that of the United Kingdom for the same year amounted to 31,483,700 persons, or nearly ten times the population of London. Taking into consideration a somewhat lower death-rate for the imperial average, it will at all events be quite within the limit of truthful statement to multiply the above quantities by nine in order to obtain the amount of valuable economic material annually diverted in the United Kingdom for a long term of years from its ultimate destiny by our present method of interment.

The necessary complement of this ceaseless waste of commodity most precious to organic life, and which must be replaced, or the population could not exist, is the purchase by this country of that same material from other countries less populous than our own, and which can, therefore, at present spare it. This we do to the amount of much more than half a million pounds sterling per annum.*

* Value of Bones imported into the United Kingdom, of which by far the larger part is employed for manure, have been, in

1866	£409,590
1869	600,029
1872	753,185

"Statistical Abstract," 20th Number. Spottiswoode, 1873.

Few persons, I believe, have any notion that these importations of foreign bones are rendered absolutely necessary by the hoarding of our own some six feet below the surface. The former we acquire at a large cost for the original purchase and for freight. The latter we place, not in the upper soil where they would be utilised, but in the lower soil, where they are not merely useless, but where they often mingle with and pollute the streams which furnish our tables. And in order to effect this absurd, if not wicked, result, we incur a lavish expenditure! I refer, of course, to the enormous sums which are wasted in effecting burial according to our present custom, a part of the question which can by no means be passed over. For the funeral rites of the 80,000 in London last year, let a mean cost of ten pounds per head be accepted as an estimate which certainly does not err on the side of excess.* Eight hundred thou-

* Items comprised in the calculation—

1. Cost of shroud, coffin, labour of digging a grave—essential now in all burials.
2. Cost of funeral carriages, horses, trappings, and accoutrements.

Ornamental coffins in wood and metal.

Vaults and monumental art—more or less employed in all funerals above the rank of pauper.

The cost of simple modes of transit are not included in the calculation, because necessary in any case, whatever the destination of the body. The above-named items are only necessary in the case of interment in a grave, and not one would be required, for example, in the case of cremation or burning of the body.

sand pounds must therefore be reckoned as absolute loss, to the costs already incurred in the maintenance of the system. Thus we pay every way and doubly for our folly.

What then is it proposed to substitute for this custom of burial? The answer is easy and simple. Do that which is done in all good work of every kind—follow Nature's indication, and do the work she does, but do it better and more rapidly. For example, in the human body she sometimes throws off a diseased portion in order to save life, by slow and clumsy efforts, it is true, and productive of much suffering; the surgeon performs the same task more rapidly and better, follows her lead, and improves on it. Nature's many agents, laden with power, the over-action of which is harmful, we cannot stop, but we tame, guide, and make them our most profitable servants. So here, also, let us follow her. The naturally slow and disagreeable process of decomposition which we have made by one mode of treatment infinitely more slow and not less repulsive, we can by another mode of treatment greatly shorten and accomplish without offence to the living. What in this particular matter is naturally the work of weeks or months, can be perfectly done in an hour or two.

The Problem to be worked is: Given a dead body, to resolve it into carbonic acid, water, and ammonia, and the mineral elements, rapidly, safely, and not unpleasantly.

The answer may be practically supplied in a properly constructed furnace. The gases can be driven off without offensive odour, the mineral constituents will remain in a crucible. The gases will ere night be consumed by plants and trees. The ashes or any portion of them may be preserved in a funeral urn, or may be scattered on the fields, which latter is their righteous destination. No scents or balsams are needed, as on Greek and Roman piles, to overcome the noxious effluvia of a corpse burned in open air. Modern science is equal to the task of thus removing the dead of a great city without instituting any form of nuisance; none such as those we tolerate everywhere from many factories, both to air and streams. Plans for the accomplishment of this have been considered; but discussion of the subject alone is aimed at here. To treat our dead after this fashion would return millions of capital without delay to the bosom of mother earth, who would give us back large returns at compound interest for the deposit.

Who can doubt now that the question is one of vital economy to the people of this country? This is still no reason why it should not be considered from the point of view of sentiment. And what has sentiment to urge on behalf of the present process? Let us see what the process is.

So far as I dare! for could I paint in its true colours the ghastly picture of that which happens to the mortal remains of the dearest we have lost,

the page would be too deeply stained for publication. I forbear, therefore, to trace the steps of the process which begins so soon and so painfully to manifest itself after that brief hour has passed, when "she lay beautiful in death." Such loveliness as that I agree it might be treason to destroy, could its existence be perpetuated, and did not Nature so ruthlessly and so rapidly blight her own handy-work, in furtherance of her own grand purpose. The sentiment of the survivor on behalf of preserving the beauty of form and expression, were it possible to do so, would, I confess, go far to neutralise the argument based on utility, powerful as it is. But a glimpse of the reality which we achieve by burial would annihilate in an instant every sentiment for continuing that process. Nay, more; it would arouse a powerful repugnance to the horrible notion that we too must some day become so vile and offensive, and, it may be, so dangerous; a repugnance surmountable only through the firm belief that after death the condition of the body is a matter of utter indifference to its dead life-tenant. Surely if we, the living, are to have sentiments, or to exercise any choice about the condition of our bodies after death, those sentiments and that choice must be in favour of a physical condition which cannot be thought of either as repulsive in itself or as injurious to others.

There is a source of very painful dread, as I

have reason to know, little talked of, it is true, but keenly felt by many persons at some time or another, the horror of which to some is inexpressible. It is the dread of a premature burial; the fear lest some deep trance should be mistaken for death, and that the awakening should take place too late. Happily such occurrences must be exceedingly rare, especially in this country, where the interval between death and burial is considerable, and the fear is almost a groundless one. Still, the conviction that such a fate is possible, which cannot be altogether denied—will always be a source of severe trial to some. With cremation no such catastrophe could ever occur; and the completeness of a properly conducted process would render death instantaneous and painless if by any unhappy chance an individual so circumstanced were submitted to it. But the guarantee against this danger would be doubled, since inspection of the entire body must of necessity immediately precede the act of cremation, no such inspection being possible under the present system.

In order to meet a possible objection to the substitution of cremation for burial, let me observe that the former is equally susceptible with the latter of association with religious funereal rites, if not more so. Never could the solemn and touching words, "ashes to ashes, dust to dust," be more appropriately uttered than over a body about to be

consigned to the furnace; while, with a view to metaphor, the dissipation of almost the whole body in the atmosphere in the ethereal form of gaseous matter is far more suggestive as a type of another and a brighter life, than the consignment of the body to the abhorred prison of the tomb.

I do not propose to describe here the processes which have been employed, or any improved system which might be adopted for the purpose of ensuring rapid and perfect combustion of the body, although much might be said in reference to these matters. There is no doubt that further experiments and research are wanting for the practical improvement of the process, especially if required to be conducted on a large scale. Something has been already accomplished, and with excellent results. I refer to recent examples of the process as practised by Dr. L. Brunetti, Professor of Pathological Anatomy in the University of Padua. These were exhibited at the Exposition of Vienna, where I had the opportunity of examining them with care. Professor Brunetti exposed the residue from bodies and parts of bodies on which he had practised cremation by different methods, and the results of his latest experience may be summarised as follows: The whole process of incineration of a human adult body occupied three and a-half hours. The ashes and bone earth weighed 1·70 kilo., about three pounds and three quarters avoirdupois. They were of a delicate white,

and were contained in a glass box about twelve inches long, by eight inches wide, and eight deep. The quantity of wood used to effect absolute and complete incineration, may be estimated from its weight, about 150 pounds. He adds that "its cost was one florin and twenty kreuzers," about two shillings and fourpence English. The box was that marked No. IX. in the case, which was No. 4149 in the Catalogue: Italian.

In an adjacent case was an example of mummification by the latest and most successful method. By a series of chemical processes it has been attempted to preserve in the corpse the appearance natural to life, as regards colour and form. Admirable as the result appears to be in preserving anatomical and pathological specimens of the body, it is, in my opinion, very far from successful when applied to the face and hand. At best a condition is produced which resembles a badly-coloured and not well-formed waxen image. And the consciousness that this imperfect achievement is the real person and not a likeness, so far from being calculated to enhance its value to the survivor, produces the very painful impression, as it were, of a debased original; while, moreover, it is impossible not to be aware that the substitution of such an image for the reality must in time replace the mental picture which exists, of the once living face lighted by emotion and intelligence, of which the preserved face is wholly destitute.

To return to the process of cremation. There are still numerous considerations in its favour which might be adduced, of which I shall name only one; namely, the opportunity it offers of escape from the ghastly but costly ceremonial which mostly awaits our remains after death. How often have the slender shares of the widow and orphan been diminished in order to testify, and so unnecessarily, their loving memory of the deceased, by display of plumes and silken scarves about the unconscious clay. And again, how prolific of mischief to the living is the attendance at the burial ground, with uncovered head, and damp-struck feet, in pitiless weather, at that chilling rite of sepulture. Not a few deaths have been clearly traceable to the act of offering that "last tribute of respect."

Perhaps no great change can be expected at present in the public opinions current, or rather in the conventional views which obtain, on the subject of burial, so ancient is the practice, and so closely associated is it with sentiments of affection and reverence for the deceased. To many persons, any kind of change in our treatment of the dead will be suggestive of sacrilegious interference, however remote either in fact or by resemblance to it, such change may be. Millions still cherish deep emotions connected both with the past and the future in relation to the "Campo Santo," and the annual "Jour des Morts." And many of these might be

slow to learn, that, if the preservation of concrete remains and the ability to offer the tribute of devotion at a shrine be desired, cremation equally, if not better, than burial, secures those ends. On the other hand, I know how many there are, both in this country and abroad, who only require the assurance that cremation is practically attainable to declare their strong preference for it, and to substitute it for what they conceive to be the present defective and repulsive procedure. A few such might by combination for the purpose, easily examine the subject still further by experiment, and would ultimately secure the power if they desired to put it in practice for themselves. And the consideration of the subject which such examples would afford, could not fail to hasten the adoption of what I am fairly entitled to call, the Natural, in place of the present Artificial Treatment of the body after death.

HENRY THOMPSON

CREMATION:

A REPLY TO CRITICS AND AN EXPOSITION OF THE PROCESS.

I CONFESS that it is not without some surprise that I find my proposal to substitute Cremation for Burial as a sanitary reform, formally opposed in the last number of the CONTEMPORARY by a member of the Medical profession. From the general public, on account of its natural and tender sympathy with ancient customs, especially when hallowed by religious rite, I had expected adverse criticism. From those who are interested, or believe themselves to be so, in the celebration of funereal pomps and ceremonials of all kinds, a protest was also not unlikely to be heard.

In all this, however, I have been mistaken. So far from encountering opposition, I have received encouragement and support from all classes to an extent which would have been to me almost incredible had I not witnessed it.

Clergymen are anxious to demonstrate how few are the words requiring change in our Burial Service to render it wholly applicable to Cremation. The public Press has all but unanimously

spoken favourably of the scheme, demanding only to be assured on certain grounds of possible objection, with which presently I shall have to deal. Persons in all ranks and stations of life write me to say there is nothing they would more gladly obtain than the assurance that their wish to be burned after death could be realized without difficulty.

And lastly, I am bound to say that the much—perhaps too much—abused undertaker, with a knowledge of the world and a breadth of view for which some might not have given him credit, has said to me:—"I only desire to supply the public want: as long as the public demands funeral cars, magnificent horses, display of feathers, and a host of attendants, in black, I must furnish them; but I am equally ready to perform Cremation to-morrow if the public demand it, and if you will tell me how to do it properly." And I find him an ally at once and not an enemy.

Surprised, then, as I am, equally at the number of my friends, and at the quarter from whence my one opponent arises, it is with no little satisfaction, since I am to have an opponent, that I find him to be one so well qualified for the task; the writer of the article in question being no less an authority than the Medical Inspector of Burials for England and Wales to the Home Department. I feel sure, then, that all which can be said in defence of Burial and in opposition to Cremation, will be

urged by so experienced and redoubtable an antagonist: one who, according to his own showing, has had a large share in controlling and directing the public money for the establishment of Cemeteries during the last twenty years. And, after all, I cannot wonder, seeing how extensive is his acquaintance with the present state of these matters, and how closely he himself is identified with them, that he should intimate at the outset that in itself my paper "is not worth a reply," "the theory on which its main conclusion is based being so entirely without reasonable foundation."

He nevertheless consents to discuss the subject, although he fails to specify the theory thus stigmatized. As I intend to examine the article carefully, the omission will probably not be important. The following may be accepted as a fair summary of the views expressed in it. Mr. Holland admits the great evils of burial when it is adopted within the limits of the town; but believes that "amply large and well-situated Cemeteries" having been established, for which "a heavy expense has been incurred;" if, furthermore, they are not too much crowded at first, and are not too soon disturbed afterwards, it is "possible for burial to be continued without danger, that is, without, not the possibility, but the probability of injury." All these advantages granted, even then Cemeteries "may be mismanaged so as to become unsafe," "for so long as men are men, mistakes, and worse

than mistakes, will occasionally occur;" and he states that "the real danger from a well-situated and well-managed Cemetery, large in proportion to the number of its burials, is not larger than that of a well-managed railway."

We learn, then, from her Majesty's Inspector that Burial is by no means a certainly innocuous procedure: although, provided all the conditions named above are present, which, by the way, is by no means always the case in our very popular suburban Cemeteries, much mischief may not occur.

In addition to this he combats at some length views which he quite erroneously attributes to me; and also imputes inaccuracy in a statement of mine relative to chemical changes, which imputation I shall prove to be wholly without foundation.

It is on these grounds that Mr. Holland advocates burial, and he is bold enough to assert its superiority to Cremation, although, it appears, he has had no experience whatever of the latter process! I doubt whether he ever witnessed an experiment, much less has performed one himself, indeed I am compelled to infer from his remarks that he knows nothing of it beyond the account which, in my last paper, I gave of the experiments by Brunetti of Padua, the results of which, although excellent, are, as I intimated more than once, very inferior to those which might easily be attained. He feels bound to admit that, "no doubt, if suffi-

cient care be taken, no actual nuisance need be caused" by Cremation, but qualifies the admission by suggesting that the process "is far more liable to mishaps" than burial, "such mishaps as must be occasionally expected, causing far more disgusting nuisance, far more difficult of concealment."

To all this I shall reply: first, that the evils of Burial are far too lightly estimated by Mr. Holland, respecting which I will adduce overwhelming testimony of a kind that he will not question or deny.

Secondly, that the plan of Cremation I have myself adopted and will now advise, is wholly free from objections of the kind Mr. Holland has imagined to exist; that it is complete in its results and is absolutely causeless of danger or offence to others.

The evils inflicted on the living by the burial of the dead, I find myself compelled to demonstrate. In my original article I assumed these to be well known and universally admitted, and had no idea that evidence on this subject could be required. This, however, was an error. Thus I have several times been asked quite gravely by young men, well educated and intelligent, if it were an ascertained fact that decaying dead bodies within a grave could really induce disease in the living: true, they might give rise to horrible effluvia, and be very disagreeable, but were they positively harmful?

And one respectable journal suggests, as worthy of consideration, whether solicitude on these matters does not betray an undue care for the preservation of life, and regards an attempt to control this fertile source of disease, as dictated by "a constant and morbid fear of death"! For all this remarkable ignorance of the subject, I can only account by the fact, that a generation has risen up since there was made that notable revelation of horrors in the London churchyards which the older men of our time can never forget, but which the younger men never knew.

Some five-and-twenty years have now elapsed since a systematic examination of the churches and grave-yards of the Metropolis was made by the most eminent and trustworthy men of the day, when details were brought to light which, at that time, smote the public with horror.

The result was that Acts of Parliament were passed prohibiting intramural interment. The poisonous abominations were removed, vaults were hermetically sealed, and the dead were carried miles away; nevertheless the same detestable process of putrefaction goes on, although it is, at present, beyond the reach of our senses, and only now and then obtrudes itself on our notice.

My task, however, becomes yet more necessary, since we have before us to-day a Medical Inspector of Burials, who, while admitting, with manifest reluctance, that some danger still attaches to the

process of interment, comes forward to advise the public, with all the weight of his experience, to continue that practice, instead of inquiring, which he has not done, whether a mode of disposing of the body may not exist which is absolutely harmless and devoid of all the evils named above.

It is clear then that, for the sake of the general reader at all events, it is necessary to refer, although briefly, to the indubitable evidence which exists relative to this subject.

For his information let me state that the "General Board of Health" made, in 1849, a special investigation, commissioning for the purpose Southwood Smith, Chadwick, Milroy, Sutherland, Waller Lewis, and others, to conduct a searching inquiry into the state of the burial-grounds of London and large provincial towns; and to devise a scheme for extramural sepulture. From their report,* which abounds in information, I shall make two or three extracts.

* "Report on a General Scheme for Extramural Sepulture." (Clowes and Sons, 1850.)

(Signed) CARLISLE.
ASHLEY.
EDWIN CHADWICK.
T. SOUTHWOOD SMITH.

The subject had been examined before by official authority; and at an early period by Walker, whose work on "Graveyards" is well known, and contains much information. (Longmans, London, 1839.)

"A Special Inquiry into the Practice of Interment in Towns;" by Edwin Chadwick (London, 1843), is replete with evidence, and should be read by those who desire to pursue the inquiry further.

Happily, any minute description of the state of the graveyards and their contents which resulted from "the present practice of interment in towns" need not be given. It will suffice for our purpose to observe that the reporters say :—

"We shall be under the necessity of making statements of a very painful nature, and sometimes of representing scenes which we feel most reluctant publicly to exhibit; but we should ill discharge the duty entrusted to us if we were to shrink from the full disclosure of the truth; more especially as a thorough knowledge of the evil is indispensable to an appreciation of the only effectual remedy." *

Passing over these details, I quote again as follows :—

"We," say the reporters, "may safely rest the sanitary part of the case on the single fact, that the placing of the dead body in a grave and covering it with a few feet of earth does not prevent the gases generated by decomposition, together with putrescent matters which they hold in suspension, from permeating the surrounding soil, and escaping into the air above and the water beneath."

After supporting this statement by illustrations of the enormous force exercised by gases of decomposition, in bursting open leaden coffins whence they issue without restraint, the reporters quote the evidence of Dr. Lyon Playfair (late H. M. Postmaster-General) to the following effect :—

"I have examined," he says, "various churchyards and burial-grounds for the purpose of ascertaining whether the layer of earth above the bodies is sufficient to absorb the putrid gases evolved. The slightest inspection shows that they are not thoroughly absorbed by the soil lying over the bodies. I know several churchyards from

* "Report on a General Scheme," &c., p. 5.

which most fœtid smells are evolved; and gases with similar odour are emitted from the sides of sewers passing in the vicinity of churchyards, although they may be more than thirty feet from them."

. . . . He goes on to estimate the amount of gases which issue from the graveyard, and estimates that for the 52,000 annual interments of the Metropolis* no less a quantity than 2,572,580 cubic feet of gases are emitted, "the whole of which beyond what is absorbed by the soil, must pass into the water below or the atmosphere above."

The foregoing is but one small item from the long list of illustrative cases proving the fact that no dead body is ever buried within the earth without polluting the soil, the water, and the air around and above it: the extent of the offence produced corresponding with the amount of decaying animal matter subjected to the process.

But "offence" only is proved; is the result not only disagreeable but injurious to the living?

The Report referred to gives notable examples of the fatal influence of such effluvia when encountered in a concentrated form; one being that of two gravediggers who, in 1841, perished in descending into a grave in St. Botolph's churchyard, Aldgate. Such are, however, extremely exceptional

* A number which has already reached 80,000, in 1873, so rapid is the increase of population. The above was written in 1849.

It has been stated by some that the mere contact of the corpse with fresh earth suffices for safe disinfection! Such a monstrous delusion is disposed of by this evidence.

instances; but our reporter goes on to say that there is abundant evidence of the injurious action of these gases in a more diluted state, and cites the well-demonstrated fact that "cholera was unusually prevalent in the immediate neighbourhood of London graveyards." I cannot cite, on account of its length, a paragraph by Dr. Sutherland attesting this fact: while the many pages detailing Dr. Milroy's inspection of numerous graveyards, are filled with evidence which is quite conclusive, and describes scenes which must be read by those who desire further acquaintance with the subject.*

Dr. Waller Lewis reports the mischievous results of breathing the pestiferous air of vaults and the kind of illness produced by it.† His long and elaborate report of the condition of these excavations beneath the churches of the metropolis, presents a marvellous view of the phenomena, which, ordinarily hidden in the grave, could be examined here illustrating the many stages of decay; a condition which he describes as a "disgrace to any civilization." But it may be said all this is changed now; intramural interment no longer exists; why produce these shocking records of the past?

* See independent examples on each of pages 13, 14, 15, 17, 18, 21, 26, 28, 43—46, and many others in the "Report" above quoted, p. 29.

† See also Chadwick's "Special Enquiry," for numerous illustrations.

Precisely because they enable us to know what it is which we have only banished to our suburban cemeteries; that we may be reminded that the process has not changed, that all this horrible decomposition removed from our doors—although this will not long be the case, either at Kensal Green or Norwood, to say nothing of some other cemeteries—goes on as ever, and will one day be found in dangerous vicinity to our homes. And here I must make an explanation which I think can be necessary to very few who read my former article, although Mr. Holland misunderstands me, and bases the greater part of his paper upon the utter misrepresentation of my meaning he is pleased to make. Because I said that in burying the corpses of to-day in distant graves we were "laying by poison for our children's children," he takes special pains to inform me that probably these particular corpses must at that future time be as innocuous as if they had been burned. No doubt they will be so, but as years pass on, the close neighbourhood and ultimate contact of the putrefying dead with our living descendants must arrive.

It is only a question of time. And it was expressly for the purpose of guarding against the misapprehension I complain of, and which has furnished my opponent with such large opportunity of needless remark, that I added the following passage, which it is only charitable to suppose he

must have overlooked (although it forms the immediate sequel to that which he quoted) :—

"It may be granted, to anticipate objection, that it is quite possible that the bodies now buried may have lost most, if not all, their power of doing mischief by the time that the particular soil they inhabit is turned up again to the sun's rays, although this is by no means certain ; but it is beyond dispute that the margin of safety as to time grows narrower and narrower year by year, and that pollution of wells and streams which supply the living must ere long arise wherever we bury our dead in this country."

Now there is no doubt that the passage which has been thus unfairly separated from its context, and so made to appear the exponent of views I do not hold, and have, indeed, expressly disclaimed, is that in which he professes to find ground for his statement that the "theory on which my main conclusion is based, is entirely without reasonable foundation." What then becomes of this sweeping assertion!

At this point let me call another witness on this important subject. Perhaps it would be difficult to name a higher authority in this country on any question of public health, than that of Dr. Edmund Parkes, Professor of Military Hygiene of the Army Medical School at Netley. With the particular part of his writings which I am about to quote, I was unacquainted until the last few days, perhaps because they appear in a work "prepared especially for use in the medical service of the army." That at all events must be my excuse for not having

them within reach before.* In a short, but suggestive, chapter "on the disposal of the dead," he proposes the following question :—

"What, then, is the best plan of disposing of the dead so that the living may not suffer? At present the question is not an urgent one; but if peace continue, and if the population of Europe increase, it will become so in another century or two. Already in this country we have seen, in our own time, a great change; the objectionable practice of interment, under and around churches in towns has been given up, and the population is buried at a distance from their habitations. For the present, that measure will probably suffice, but in a few years the question will again inevitably present itself.

"Burying in the ground appears certainly the most insanitary plan of the three methods.† The air over cemeteries is constantly contaminated (see p. 76), and water (which may be used for drinking) is often highly impure. Hence, in the vicinity of graveyards two dangers to the population arise, and in addition, from time to time, the disturbance of an old graveyard has given rise to disease. It is a matter of notoriety that the vicinity of graveyards is unhealthy."

To return to our reporters; we have seen the condition of graveyards in towns, but it will not be undesirable to glance at the evidence relating to the condition of provincial churchyards, where, in the midst of a sparse population, the pure country air circulates with natural freedom—numbers of such spots are mentioned—let one single example be "Cadoxton Churchyard, near Neath." Respecting this, the reporter writes:—"I do not know

* A Manual of Practical Hygiene. (London, Churchill, 1864.)

† "Burial in the Land, or at Sea, and Burning," p. 458.

how otherwise to describe the state of this churchyard than by saying that it is truly and thoroughly abominable. The smell from it is revolting. I could distinctly perceive it in every one of the neighbouring houses which I visited, and in every one of these houses there have been cases of cholera or severe diarrhœa." This is not a selected specimen, some are even worse; for further examples see below.*

I next complain that there is insufficient recognition in Mr. Holland's paper, of the unhealthy character of the emanations which result from the process of putrefaction when affecting the human body. He lays great stress on the fact that at the *end* of those long stages of decay which burial renders necessary, the result is as harmless as at the end of the process of Cremation, passing over as not worth notice the fact that for long years the corpse is replete with influences which are mischievous to anything which may come within their range; absolute isolation being the only condition of safety. Conversely stated, this is precisely my own argument, and demonstrates triumphantly the superiority of Cremation. I affirm that by burning, we arrive in one hour, without offence or danger, at the very stage of harmless result which burying requires years to produce. True, indeed, it is,

* Op. cit., p. 48. Report of Mr. Bowie, describing graveyards at Merthyr-Tydvil; Hawick, Roxburghshire; Greenock, and other places.

"that the ultimate result is the same," but an infinity of mischief may happen by his process, and none can happen by mine. And, after all, he can only on his own showing claim a perfect result by burial "*if* no more dead be buried than the free oxygen contained in rain and dew carried through it, will decompose; and *if* such soil be left undisturbed, &c., and *if* the use of such ground for burial be discontinued," &c., &c. Again there is another instance of Mr. Holland's insufficient recognition of the unhealthy character of cadaveric emanations which I must particularly call attention to. I had stated that in the resolution of an animal body, the gaseous products were carbonic acid, water, and ammonia. He impeaches my correctness, saying that I am

"Not, however, quite accurate in describing that result to be the formation of water, of ammonia, and of carbonic acid, as the chief products; for if the decomposition either with or without fire be complete, no ammonia will be formed in the soil; or, if formed, it will be converted before it need escape either into the air, or be carried off by water, in the form either of uncombined nitrogen, or changed into some compound of that element with oxygen, such as nitric or nitrous acid, &c."

I never said the ultimate result of the resolution in question was ammonia, but I repeat that ammonia is an intermediate formation in large quantity, by which nitrogen passes off before it comes to be "the nitric or nitrous acid" he speaks of, the latter being, by the way, no more an ultimate step in the process than is ammonia. At what point shall

we stop if we are to trace to their last stages the volatile component elements of the body? Why certainly not at ammonia, nor at nitric acid, but at carbon, nitrogen, hydrogen, and oxygen. I chose to rest at ammonia, because the evolution of ammonia is an important fact, and I re-assert that it is largely produced. So much for the *à priori* statement. Now what is the evidence from observation in this matter? Was I right or was I wrong, as Mr. Holland says I am, in stating that the body is resolved among other things into ammonia? Any intelligent witness will do for me, but we have Dr. Parkes still in the box; let us interrogate him. That same short chapter almost commences with the following passage:—

"After death the buried body returns to its elements, and gradually and often by the means of other forms of life which prey on it, a large amount of it forms carbonic acid, *ammonia*, sulphuretted and carburetted hydrogen, nitrous and nitric acid, and various more complex gaseous products, many of which are very fœtid, but which, however, are eventually all oxygized into the simpler combinations." *

In another part of the volume, in speaking of the air of churchyards, he writes:—

"The decomposition of bodies give rise to a very large amount of carbonic acid . . . . *Ammonia* and an offensive putrid vapour are also given off."

"In vaults, the air contains much carbonic acid, carbonate or sulphide of *ammonium*, nitrogen, hydrosulphuric acid, and organic matter." †

* Parker, p. 457. † Op. cit. p. 76.

My readers will agree with me, I think, that this matter is disposed of.

I now arrive at the second part of my subject, in which I have to show that the plan of Cremation I have myself adopted, and will now advise, is wholly free from objections of the kind Mr. Holland has imagined to exist; that it is complete in its results, and is absolutely causeless of danger of offence to any.

Many persons have expressed to me the opinion that I ought in my first paper to have described what I believed to be the best mode of performing Cremation. May I say that this was also desired by the Editor of this Journal. I felt, however, although I was prepared to give the information in question, that it was impossible to judge beforehand what might be the reception by the public of my project, and that I might perhaps go too far and weight it too heavily if I actually sketched the process by which each reader could realize for himself its nature and mode of operation. I think the reticence was prudent, although it might possibly have been unnecessary.

I think it is fair to myself to say that, before that first article was published, a scheme for burning two thousand bodies a week for London (the average present requirement being about sixteen hundred) was quite completed, and that I had satisfied myself that to accomplish this would not be a difficult task, and that it would occasion no nuisance whatever.

Without entering on those details, I will give an example of what I have done in the matter of resolving the body into its ultimate elements by heat.

And first of all I must request the reader to dismiss from his mind all the allegations against the practice of Cremation which Mr. Holland has made, grounded on what he imagines that process to be. He states of it "would necessarily require the active superintendence of a class of men whose services for such an office it would be scarcely possible always to obtain; while it is evident that imperfectly conducted burning of the dead would be inexpressibly shocking, and apt not rarely to occur." The point first named is a matter barely worth contesting; but the last five words are absolutely without foundation, and I challenge him to show a tittle of evidence to support the very grave allegation they contain.

A powerful reverberating furnace will reduce a body of more than average size and weight, leaving only a few white and fragile portions of earthy material, in less than one hour. I have myself personally superintended the burning of two entire bodies, one small and emaciated of 47 lbs. weight, and one of 140 lbs. weight, not emaciated, and possess the products—in the former case, weighing $1\frac{3}{4}$ lbs.; in the latter, weighing about 4 lbs. The former was completed in twenty-five minutes, the latter in fifty. No trace of odour was perceived—

indeed, such a thing is impossible,—and not the slightest difficulty presented itself. The remains already described were not withdrawn till the process was complete, and nothing can be more pure, tested by sight or smell, than they are, and nothing less suggestive of decay or decomposition. It is a refined sublimate, and not a portion of refuse, which I have before me. The experiments took place in the presence of several persons. Among the witnesses of the second experiment was Dr. George Buchanan, the well-known medical officer of the Local Government Board, who can testify to the completeness of the process.

I challenge my opponent to produce so fair a result from all the costly and carefully-managed cemeteries in the kingdom, and I offer him twenty years in which to elaborate the process.

In the proceedings above described, the gases which leave the furnance chimney during the first three or four minutes of combustion are noxious: after that time they cease to be so, and no smoke would be seen. But those noxious gases are not to be permitted to escape by any chimney, and will pass through a flue into a second furnace, where they are entirely consumed; and the chimney of the latter is smokeless—no organic products whatever can issue by it. A complete combustion is thus attained. Not even a tall chimney is necessary, which might be pointed at as that which marked the site where Cremation is performed. A

small jet of steam quickening the draught of a low chimney is all that is requisite. If the process is required on a large scale, the second furnace could be utilized for Cremation also, and its products passed through another, and so on without limit.

Subsequent experiments, however, by another method, have resulted in a still greater success. By means of one of the furnaces, invented by Dr. Wm. Siemens, I [redacted] obtained even a more rapid and more complete combustion than before. The body employed was a severe test of its powers, for it weighed no less than 227 lbs., and was not emaciated. It was placed in a cylindrical vessel about seven feet long by five or six in diameter, the interior of which was already heated to about 2000 Fahr. The inner surface of the cylinder is smooth, almost polished, and no solid matter but that of the body is introduced into it. The product, therefore, can be nothing more than the ashes of the body. No foreign dust can be introduced, no coal or other solid combustible being near it: nothing but a heated hydrocarbon in a gaseous form and heated air. Nothing is visible in the cylinder before using it but a pure almost white interior, the lining having acquired a temperature of white heat. In this case, the gases given off from the body so abundantly at first, pass through a highly heated chamber among thousands of interstices made by intersecting fire-bricks, laid throughout the entire chamber, lattice-fashion, in order to minutely divide

and delay the current, and expose it to an immense area of heated surface. By this means they were rapidly oxidised, and not a particle of smoke issued by the chimney: no second furnace, therefore, is necessary by this method to consume any noxious matters, since none escape. The process was completed in fifty-five minutes, and the ashes, which weighed about five pounds, were removed with ease. The foregoing is a very meagre sketch of [illegible]own men's furnace, the principle of which i[illegible]rally, and to engineers, and to scientific men gen[illegible]ess in need not be described in detail here.

I will now add—not that it affects the proc[illegible] the slightest degree as to results—that all my experiments hitherto have been made with the lower animals.

As a rough and unfinished sketch of a system to be followed, when Cremation is generally adopted, I would suggest the following :—

When death occurs and the necessary certificate has been given (relative to which an important suggestion will be made hereafter), the body is placed in a light wood shell, then in a suitable outside receptacle preparatory to removal for religious rites or otherwise. After a proper time has elapsed, it is conveyed to the spot where Cremation is to be performed. There, nothing need be seen by the last attendant or attendants than the placing of a shell within a small compartment, and the closing of the door upon it. It slides down into the heated

chamber, and is left there an hour, till the necessary changes have taken place. The ashes are then placed at the disposal of the attendants.

I now come to a very serious matter, treated of by Mr. Holland in a manner of which I am compelled to complain. He is pleased to make merry himself, and to suggest that I am joking—or, to use his own phraseology, "poking fun"—when calling attention to my remarks relative to the "economical" view of Cremation.

In speaking of this, I stated that "it is an economic subject, *whether we will it or not.*" Now I wish him and all my readers to understand, that I was never more serious, never more earnest in my life than I was then and am at this moment, and in consideration of this question of "economy." Anything like "fun" or a "joke," wherever else it may be tolerated, is wholly out of place here. Seeing that the Great Power which has ordained the marvellous and ceaseless action which transmutes every animal body as quickly as possible into vegetable matter, and *vice versa*, and has arranged that this harmonious cycle should be the absolute and necessary law for all existence, I have space for no other sentiments than those of submission, wonder, and admiration. If any say that it is in bad taste, or does violence to some right feeling, to speak of the fate that inevitably awaits every one of us, in that, on some future day, the elements of our bodies must enter into that other life of the vegetable world, whence once they

came, let the complaint thereof be carried to the Highest Court of the Universe, and let the question be asked there, Whether "the Judge of all the earth doth right?"

Meantime it suffices us to know that the very existence of these cavillers is solely due to that Divine fecundity which pervades all nature, and is regulated by economical principles, the beneficent operation of which we may feebly postpone, doing some notable harm thereby, but happily can never resist in the end.

My charge against Mr. Holland, however, is not this, but something much more serious. Alluding to the small modicum of remains in the form of ashes after Cremation, and which I was content should be preserved in an urn, stating only that the fields were their "righteous" destination,—as they are,—he speaks of the latter suggestion as a "desecration" and as "outraging family affection;" and actually associates it in some fashion with savagery and cannibalism. Yet, can we believe it, he, so tender of sentiment on this subject of deceased remains, himself actually advocates and practises the utilizing of by far the greater part of those remains for the production of grass and other vegetables for the express purpose of keeping his cemeteries sweet and wholesome! The gaseous elements of these buried bodies, which, as I particularly insisted upon when dealing with that question of economy, are by far the greater part, being incal-

culable in amount in relation to the ashes, which are by comparison a mere trifle, and which alone he is pleased to mention. That greater part, I say, he not only uses himself, but he knows that this very utilization of it is the only way he has of preserving a cemetery in a tolerable condition. He knows perfectly well that the presence of abundant plant-growth is essential in the cemetery, to assimilate the noxious gases arising from the buried bodies before alluded to, and that those plants owe their life and structure to the very elements of our "friends and relatives," about whom he professes to be so utterly shocked that I should conceive it possible to utilize them for any economical purpose! I charge my opponent then, his professions notwithstanding, as in part the manager of the cemeteries of this country during twenty years, with having presided over perhaps the largest institution that ever existed for transmuting the human body into vegetable growth of various kinds. My one objection to his system is, that it does it so slowly, so offensively, and so dangerously.

Now, lest perchance someone not himself acquainted with the facts alluded to may desire, for such a statement, other authority than my own, let us listen once more, and for the last time, to Dr. Parkes. In order to oxidize the fœtid organic exhalations of the burying-ground, he says: "The only means which present themselves, as applicable in all cases, are the deep burial and the use of

plants, closely placed in the cemetery. There is no plan which is more efficacious for the absorption of the organic substances, and perhaps of the carbonic acid, than plants; but it would seem a mistake to use only the dark, slow-growing evergreens; the object should be to get the most rapidly growing trees and shrubs," &c.*

But even this is not my opponent's crowning inconsistency. So determined is he not to accept Cremation, that he suggests another mode, "that of sinking the dead in the depths of the ocean," as having "far more to recommend it." No doubt there is much to be said in its favour; much more certainly than for burial. Yet shocked as he is at the notion that his father's ashes should ever fertilize the field, he would consign the body to a place whence, almost instantly, it would be devoured by fish and crustaceans, whose numbers would be multiplied correspondingly by their benefactor's enormous contribution of food, as the public markets soon would testify. No animal multiplies more rapidly than fish, and the "economic" question would be determined in a manner more complete, and more direct, and with a more remunerative result than any which I had ever dared, or still should dare, to suggest!

This remarkable proposal appears actually on the same page as that in which he affects to be

* P. 458. Dr. Sutherland also strongly insists on the same practice.

outraged by my suggestion that burning the body would necessarily contribute to the "food production" of the earth.

And here I shall take leave of Mr. Holland, to seek some less formidable antagonist. Possibly in this light may be regarded the writer of an article in the *Spectator* newspaper,* whose objection, supposing it to be seriously urged, is almost the only one besides those already noticed which [redacted] appeared within the range of our periodical [redacted].

[redacted]etch of charity one might almost imagine [redacted]e a joke, seeing it is the writer's only way of [redacted]eat from a wholly untenable position. He urges that as the present generation is doing its best to exhaust "the rivers, the rainfall, the mines, and the natural fertility of the earth," we ought to leave our dead remains "in bank for our descendants;" or, in other words—for the generous sentiment is repeated—"it is well that such a deposit as the dead of generations should be left to our posterity!" Waiving altogether the greatest objection to this testamentary provision for our grandchildren—viz., the amount of disease and death which is unquestionably produced by burial in the soil—the writer ought to have known that the "bank" in question, to use his own simile, pays no interest; and that it is perfectly certain that such capital rendered productive at once, according to

* *Spectator*, January 3, 1874.

nature's design, must yield a far greater profit, even for posterity, than his own notable one of burying this one talent in a napkin as an offset against what he is pleased to consider our present exhaustion of "rivers and rainfall," which he declares is taking place at "railway speed!" As if consumption of water in any form, were it a million-fold what it is, could exhaust or diminish the common stock a single drop! No modern schoolboy could make such a blunder as this; nevertheless, it is only a specimen of others existing within the short limits of that article, and equally easy of exposure, if need be. I cannot pass over, however, one statement that this writer has dared to make. He speaks of my figures relative to the number buried in London in 1873, and estimating the amount of bone-earth and ashes belonging thereto, as "very debateable," and, further, that they "are open to question." After saying this, he declines "to fight so eminent a physicist on so small a point of detail." Is the point so small? I declare those figures to be below, and not above, the truth, and am amply prepared to prove it. My veracity is at stake, for I know no higher crime than to issue misleading or exaggerated numerical statements in order to prove a case, unless, indeed, it be to utter insinuations, without offering a tittle of proof to support them, that an accurate numerical statement is untrue.

I now desire to afford explanations which have been asked relative to the following very important

subject. It has been said, and most naturally, what guarantee is there against poisoning if the remains are burned, and it is no longer possible, as after burial, to reproduce the body for the purpose of examination? It is to my mind a sufficient reply that, regarding only "the greatest good for the greatest number," the amount of evil in the shape of disease and death, which results from the present system of burial in earth, is infinitely larger than the evil caused by secret poisoning is or could be, even if the practice of the crime were very considerably to increase. Further, the appointment of officers to examine and certify in all cases of death would be an additional and very efficient safeguard. But,—and here I touch on a very important subject,—Is there reason to believe that our present precautions in the matter of death-certificate against the danger of poisoning are what they ought to be? I think that it must be confessed that they are defective, for not only is our system inadequate to the end proposed, but it is less efficient by comparison than that adopted by foreign governments. Our existing arrangements for ascertaining and registering the cause of death are very lax, and give rise, as we shall see, to serious errors. In order to attain an approach to certitude in this important matter, I contend that it would be most desirable to nominate in every district a properly qualified inspector to certify in all cases to the fact that death has

taken place, to satisfy himself as far as possible that no foul play has existed, and to give the certificate accordingly. This would relieve the medical attendant of the deceased from any disagreeable duty, relative to inquiry concerning suspicious circumstances, if any have been observed. Such officers exist throughout the large cities of F[illegible] and Germany, and the system is more[illegible] pursued throughout the provinces.* I[illegible] burial can take place without the written p[illegible] of the "Médecin-Vérificateur;" and wh[illegible] adopt Cremation or not, such an officer [illegible] with advantage, be appointed here.*

* The practice referred to is thus regulated :—

The following is the text of the French law. Code Napol[illegible] Article 77. "Aucune inhumation ne sera faite sans une aut[illegible] sur papier libre et sans frais, de l'officier de l'état civil, qui [illegible] la délivrer qu'après s'être transporté auprès de la person[illegible] pour s'assurer du décès, et que 24 heures après le décès, h[illegible] prévus par les règlements de police."

Thus the verification of the deceased must always be m[illegible] civil officer in person ; viz., by the Mayor of the town, or by [illegible] one he shall appoint. The law, however, is executed differe[illegible] Paris and in the provinces. In Paris, the verification is made e[illegible] sively by medical men appointed for this purpose in each "quarti[illegible] Their functions are defined by an Act of the 31st of Decembe[illegible] 1821. As soon as a death is reported, the civil officer communicates with the medical man of the "quartier" in which the deceased resided, and awaits the report to decide (in concert with the deceased's friends) at what hour burial should take place. The medical man attends at the residence indicated, acquaints himself with all the circumstances of the illness, and reports in writing relative to the following particulars :—1. The christian and surname of the deceased ;

For perhaps it is not generally known, even, as it would seem, by those who have emphasized so notably the objection in question to Cremation, that many bodies are buried in this country without any medical certificate at all; and that among these any number of deaths by poison may have taken [redacted] for anything that anybody knows. Is it in [redacted]nces chiefly that this lax practice exists? [redacted]nd more particularly in the principality [redacted] But it occurs also in the heart of London. [redacted] many certificates of death are signed every [redacted]n London by some non-medical persons. In [redacted]etropolitan parish, not long ago, which I can [redacted], but do not, above forty deaths were registered [redacted] year on the mere statement of neighbours of [redacted] deceased. No medical certificate was pro- [redacted], and no inquest was held; the bodies were

[redacted]ex; 3. If married or not; 4. The age; 5. The profession; [redacted]exact date and hour of the decease; 7. The "quartier," [redacted]et, the number and story of the house in which it occurred; [redacted]e nature of the illness, and if there be any reason for making [redacted]topsy; 9. The duration of the illness; 10. The name of the [redacted]ns who provided the medicines; 11. The names of the doctors [redacted] others who attended the case. Besides this verification made [redacted] doctors belonging to each "quartier" of Paris, by an order [redacted]y the [redacted]efect of the Seine, April, 1839, a committee was formed to [redacted] of the P[redacted]he service. The medical men who attest the facts con- watch over t[redacted]h at Paris are called the "Médecins-Vérificateurs [redacted] nected with dea[redacted] des décès."

In Vienna, a similar document is always prepared, and perhaps with still greater care and minuteness. The same may be said of Munich, Frankfort, Geneva, and other Continental cities.

buried without inquiry. This practice is not illegal; and, in my opinion, it goes far to make a case for the appointment of a "Médecin-Vérificateur." During the existence of pestilence especially, such a safeguard is necessary. Before I quit this subject, let me make a brief extract from evidence given by Mr. Simon before the Royal Sanitary Commission in 1869, from which it appears that medical certification of death is not the rule, but the exception, in some districts of Wales. He says:—

"The returns of death made to the Registrar-General are necessarily imperfect. . . . . We had to make inquiry on one occasion as to the supposed very large prevalence of phthisis in some of the South Wales counties. . . . . It turned out that this great appearance of phthisis in the death registers depended upon the fact that the causes of death were only exceptionally certified by medical men. I remember that in one case only 15 per cent. of the deaths had been medically certified. The non-medical certifiers of death thought that 'consumption' was a good word to cover death generally, and that any one who died somewhat slowly was put down as dying of 'consumption,' and this appeared in the Registrar-General's returns as phthisis."

Dr. Sutherland long ago called attention to this matter. I quote his remarks from the work above named. Referring to Paris, Munich, and other cities, he says:—

"Where there are regularly appointed verificators . . . who are generally medical men in practice . . . . the districts of the city are divided between them. . . . . The instructions under which these officers act are of a very stringent character, and the procedure is intended to obviate premature interment, and to detect crime. The French and the German method of verification is intended to be pre-

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entive. A number of instances were mentioned to me in which rimes which would otherwise have escaped notice were detected by he keen and practised eye of the Verificator, and the general opinion ertainly was that much crime was prevented." *

This is but an episode in treating of Cremation: a very important one nevertheless. I have therefore thought it right to take this opportunity of advocating a more stringent provision than now exists for an official inspection and certificate in all cases of death.

[redacted]tly, it would be possible, at much less cost [redacted]s at present incurred for burial, to preserve, in every case of death, the stomach, and a portion of one of the viscera, say for fifteen or twenty years or thereabouts, so that in the event of any suspicion subsequently occurring, greater facility for examin[redacted]n would exist than by the present method of [redacted]humation. Nothing could be more certain to check the designs of the poisoner than the knowledge that the proofs of his crime, instead of being buried in the earth (from whence, as a fact, not one in a hundred thousand is ever disinterred for examination) are safely preserved in a public office, and that they can be produced against him at any moment. The universal application of this plan, although easily practicable, is however obviously unnecessary. It is quite certain that no pretext for such conservation can exist in more than one instance in every five hundred deaths. In the re-

* Op. cit.

mainder, the fatal result would be attributed without mistake to some natural cause—as decay, fever, consumption, or other malady, the signs of which are clear even to a tyro in the medical art. But in any case in which the slightest doubt arises in the mind of the medical attendant, or in which the precaution is desired or suggested by a relative, or whenever the subject himself may have desired it, nothing would be easier than to make the requisite conservation. As before stated, the existence of an official verificator would relieve the ordinary medical attendant of the case from active interference in the matter. If then the public is earnest in its endeavour to render exceedingly difficult or impossible the crime of secret poisoning,—and it ought to be so if the objection to Cremati[illegible]on this ground is a valid one, the sooner s[illegible] measures are taken to this end the better, whe[illegible] burial in earth or Cremation be the future m[illegible] of treating our dead.

I must add one word in reply to a [illegible] rather hastily objected that the esti[illegible] original paper of the mean cost o[illegible] burials in London as about £10 per head is to[illegible]o high. I have re-examined my calculations and find it, if in error at all, too low. Curiously enough, in going through Dr. Edwin Chadwick's work, already referred to, for other purposes, I found that he also made a similar calculation thirty years ago, and that his estimate is rather higher than mine. He puts it

at more than £600,000 for the metropolis, when the population was a little more than one-half what it is now; I reckoned £800,000 for the year 1873. And he considers the cost of funerals for England and Wales to be, at that time, nearly five millions sterling. He includes cost of transit, which I omit, as being necessary equally with Cremation and burial, so that the difference between us is not considerable.

To sum up:—

For the purposes of Cremation nothing is required but an apparatus of a suitable kind, the construction of which is well understood and easy to accomplish. With such apparatus the process is rapid and inoffensive, and the result is perfect. The space necessary for the purpose is small, and little skilled labour is wanted.

Not only is its employment compatible with the rites, but it enables them to be conducted *burial* case and with far greater safety to ...s than at a cemetery. For example, ... place in the open air, and necessitates exposure to ...ll weathers, while Cremation is necessarily conducted within a building, which may be constructed to meet the requirements of mourners and attendants in relation to comfort and taste.

Cremation destroys instantly all infectious quality in the body submitted to the process, and effectually prevents the possibility of other injury to the living from the remains at any future time. All

care to prevent such evil is obviously unnecessary, and ceases from the moment the process commences. The aim of Cremation is to prevent the process of putrefaction.

On the other hand, Burial cannot be conducted without serious risks to the living, and great care is required to render them inconsiderable with our present population. Costly cemeteries also are necessary with ample space for all possible demands upon it, and complete isolation from the vicinity of the living, to ensure, as far as possible, the absence of danger to them.

It is a process designed essentially to prolong decay and putrefaction with all its attendant mischief; and the best that can be affirmed of it is, that in the course of many years it arrives, by a process which is antagonistic to the health of survivors, at results similar to, but less complete, than Cremation produces in an hour without injury to any.

HENRY THOMPSON.

THE END.

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